CLAIMS

What is claimed is:

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Claim 1. A method of determining a current in an electric machine coupled to a polyphase bus, the method comprising:

detecting a rotational position of said electric machine with a position encoder coupled to said electric machine;

controlling an inverter comprising a plurality of switching devices, said inverter having an input coupled to a direct current bus, and an output coupled to said polyphase bus, said inverter responsive to commands from a controller coupled to said inverter and to said position encoder;

measuring a current from said direct current bus; and

capturing said current at a predefined interval of time.

Claim 2. The method of Claim 1 further comprising:

determining a set of values representative of a magnitude of currents on each phase of said polyphase bus.

Claim 3. The method of Claim 2 wherein said predefined interval of time is established when:

said electric machine is within a predefined rotational angle;

a predefined combination of said switching devices are active; and

an angle between a phase voltage and a corresponding phase current on each phase of said polyphase bus being within a range of about minus thirty to about thirty degrees.

Claim 4. The method of Claim 1 further comprising:

determining a value representative of a torque current from said current.

Claim 5. The method of Claim 4 wherein said predefined interval of time is established when:

a particular back EMF voltage waveform for a given phase of said electric machine attains its peak value;

said electric machine is within a predefined rotational angle;

a predefined combination of said switching devices are active; and

an angle between a phase voltage and a corresponding back EMF on each phase of said polyphase bus being within a range of about minus thirty to about thirty degrees.

Claim 6. The method of Claim 1 wherein said electric machine comprises a permanent magnetic motor and said position encoder includes a rotor position sensor.

Claim 7. The method of Claim 1 wherein said electric machine is a permanent magnet DC brushless motor characterized by a sinusoidal magnetic field excitation.

Claim 8. The method of Claim 1 wherein said capturing is characterized by sampling a signal value representative of said current and said sampling is controlled by said controller to be operative only at said predefined interval of time.

Claim 9. A system for determining a current in an electric machine coupled to a polyphase bus, the system comprising:

a position encoder coupled to said electric machine to detect rotational position;

an inverter having an input coupled to a direct current bus, and an output coupled to said polyphase bus, responsive to commands from a controller;

said controller coupled to said inverter and to said position encoder;

a sensor to detect a current from said direct current bus; and

wherein said sensor captures said current at a predefined interval of time.

Claim 10. The system of Claim 9 wherein said controller determines a set of values representative of a magnitude of currents on each phase of said polyphase bus.

Claim 11. The system of Claim 10 wherein said predefined interval of time is established when:

said electric machine is within a predefined rotational angle;

a predefined combination of said switching devices are active; and

an angle between a phase voltage and a corresponding phase current on each phase of said polyphase bus being within a range of about minus thirty to about thirty degrees.

Claim 12. The system of Claim 9 wherein said controller determines a value representative of a torque current from said current.

Claim 13. The system of Claim 12 wherein said predefined interval of time is established when:

a particular back EMF voltage waveform for a given phase of said electric machine attains its peak value;

said electric machine is within a predefined rotational angle;

a predefined combination of said switching devices are active; and

an angle between a phase voltage and a corresponding back EMF on each phase of said polyphase bus being within a range of about minus thirty to about thirty degrees.

Claim 14. The system of Claim 9 wherein said electric machine comprises a permanent magnetic motor and said position encoder includes a rotor position sensor.

Claim 15. The system of Claim 9 wherein said electric machine is a permanent magnet DC brushless motor characterized by a sinusoidal magnetic field excitation.

Claim 16. The system of Claim 9 wherein said inverter is comprised of switching devices coupled to and responsive to commands from said controller.

Claim 17. The system of Claim 9 wherein said capturing is characterized by sampling a signal value representative of said current and said sampling is controlled by said controller to be operative only at said predefined interval of time.

Claim 18. A storage medium encoded with a machine-readable computer program code for determining a current in an electric machine coupled to a polyphase bus, said storage medium including instructions for causing controller to implement a method comprising:

detecting a rotational position of said electric machine with a position encoder coupled to said electric machine;

controlling an inverter comprising a plurality of switching devices, said inverter having an input coupled to a direct current bus, and an output coupled to said polyphase bus, said inverter responsive to commands from a controller coupled to said inverter and to said position encoder;

measuring a current from said direct current bus; and

capturing said current at a predefined interval of time.

Claim 19. The storage medium of Claim 18 further including instructions for causing said controller to perform said method further comprising:

determining a set of values representative of a magnitude of currents on each phase of said polyphase bus.

Claim 20. The storage medium of Claim 19 wherein said predefined interval of time is established when:

said electric machine is within a predefined rotational angle;

a predefined combination of said switching devices are active; and

an angle between a phase voltage and a corresponding phase current on each phase of said polyphase bus being within a range of about minus thirty to about thirty degrees.

Claim 21. The storage medium of Claim 18 further including instructions for causing said controller to perform said method further comprising:

determining a value representative of a torque current from said current.

Claim 22. The storage medium of Claim 21 wherein said predefined interval of time is established when:

a particular back EMF voltage waveform for a given phase of said electric machine attains its peak value;

said electric machine is within a predefined rotational angle;

a predefined combination of said switching devices are active; and

an angle between a phase voltage and a corresponding back EMF on each phase of said polyphase bus being within a range of about minus thirty to about thirty degrees.

Claim 23. The storage medium of Claim 18 wherein said electric machine comprises a permanent magnetic motor and said position encoder includes a rotor position sensor.

Claim 24. The storage medium of Claim 18 wherein said electric machine is a permanent magnet DC brushless motor characterized by a sinusoidal magnetic field excitation.

Claim 25. The storage medium of Claim 18 wherein said capturing is characterized by sampling a signal value representative of said current and said sampling is controlled by said controller to be operative only at said predefined interval of time.

Claim 26. A computer data signal embodied in a carrier wave for determining a current in an electric machine coupled to a polyphase bus, said data signal comprising code configured to cause a controller to implement a method comprising:

detecting a rotational position of said electric machine with a position encoder coupled to said electric machine;

controlling an inverter comprising a plurality of switching devices, said inverter having an input coupled to a direct current bus, and an output coupled to said polyphase bus, said inverter responsive to commands from a controller coupled to said inverter and to said position encoder;

measuring a current from said direct current bus; and

capturing said current at a predefined interval of time.

Claim 27. The computer data signal of Claim 26 further comprising code configured to cause a controller to implement said method further comprising:

determining a set of values representative of a magnitude of currents on each phase of said polyphase bus.

Claim 28. The computer data signal of Claim 27 wherein said predefined interval of time is established when:

said electric machine is within a predefined rotational angle;

a predefined combination of said switching devices are active; and

an angle between a phase voltage and a corresponding phase current on each phase of said polyphase bus being within a range of about minus thirty to about thirty degrees.

Claim 29. The computer data signal of Claim 26 further comprising code configured to cause a controller to implement said method further comprising:

determining a value representative of a torque current from said current.

Claim 30. The computer data signal of Claim 29 wherein said predefined interval of time is established when:

a particular back EMF voltage waveform for a given phase of said electric machine attains its peak value;

said electric machine is within a predefined rotational angle;

a predefined combination of said switching devices are active; and

an angle between a phase voltage and a corresponding back EMF on each phase of said polyphase bus being within a range of about minus thirty to about thirty degrees.

Claim 31. The computer data signal of Claim 26 wherein said electric machine comprises a permanent magnetic motor and said position encoder includes a rotor position sensor.

Claim 32. The computer data signal of Claim 26 wherein said electric machine is a permanent magnet DC brushless motor characterized by a sinusoidal magnetic field excitation.

Claim 33. The computer data signal of Claim 26 wherein said capturing is characterized by sampling a signal value representative of said current and said sampling is controlled by said controller to be operative only at said predefined interval of time.